



## Policy progress on ICZM in Peru

Juan M. Barragán<sup>a,\*</sup>, Óscar Lazo<sup>b</sup>

<sup>a</sup> Research Group of Integrated Coastal Zone Management, Universidad de Cadiz, Spain

<sup>b</sup> Universidad Nacional Agraria La Molina, Av. la Molina, Lima, Perú, Spain

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### ABSTRACT

The aim of this paper is to update and synthesise the current body of knowledge on Integrated Coastal Zone Management (ICZM) in Peru. Proper management of marine and coastal areas and their ecosystems is of the upmost importance in this country. Almost 60% of the population and a substantial segment of the economy are concentrated on coastal territory, which barely accounts for 13% of the surface area of the country. In addition, this is the natural region with less water resources but has generated the majority of recent economic growth. Artisanal fishing stands out as one of the predominant economic activities for management consideration.

This study is comprised of ten key elements that have been chosen in order to analyse national coastal management: Policy, Normative, Institutions, Strategies, Instruments, Information, Education, Resources, Managers and Participation. The results obtained are of great interest due to important advances that have been found in a number of these management elements (normative and instruments). Other results point to opportunities that could potentially have a great impact in the future (policy and institutions). However, deficiencies have also been detected and consequently it is recommended that they be corrected urgently (managers, resources and participation).

Peru is currently working with other international institutions with the aim of advancing the definition of its National Policy in Integrated Coastal Zone Management, and its corresponding National Programme. Important decisions related with the contribution of regional and local scale to national efforts are key decisions in this process.

### 1. Introduction

In the context of Latin America and the Caribbean (LAC) there are interesting examples of national studies: Mexico (Rivera-Arriaga and Villalobos, 2001), Uruguay (Martinez and Fournier, 1999; Perez and Chica, 2015), Brazil (Barragan Munoz, 2001; Jablonski and Filet, 2008), Argentina (Barragán Munoz, 2003; Barragán Munoz et al., 2003), Chile (Barragán et al., 2005), Dominican Republic (George, 1997), Honduras (Caviedes et al., 2014). The Ibermar network (Barragán, 2009), and the work of Scherer et al. (2014) provide two other references that can be cited for the current state of ICZM in LAC countries.

One of the first insights to emerge is that there is a lack of information published on the management of the Peruvian coast. At most, there are studies related to descriptive geography (Novoa Goicoechea, 2007). In particular, research on the Humboldt Current and its fisheries (Arellano and Swartzman, 2010; Gutiérrez et al., 2016, 2017) or with respect to water resources (Higa and Chen, 2010). It is likely that the weakness of ICZM information is due to the absence of a continuous line

of investigation, which provides the primary reason to consider the present research.

On the other hand, Peru requires an ICZM policy due to significant issues on its coasts related to exposure and vulnerability to climate change and the El Niño phenomenon (MINAM, 2016; MINAM, PNUD and GEF, 2009), water and coastal soil pollution, deterioration or loss of natural habitats (ProNaturaleza, 2010), transformation of morphosedimentary processes, inadequacies in the quality of life in cities and urban environments (OECD - Organization for Economic Cooperation and Development - and ECLAC - Economic Commission for Latin America-, 2016), loss of competitiveness and attractiveness for investment and conflicts between users of different ecosystem services (Galarza and Kámiche, 2015). These issues affect a substantial part of the population, as more than 56% reside in the country's coastal zone.

It is therefore necessary to recognize the significant role that some intergovernmental and international cooperation agencies are currently playing. The oldest, albeit with few economic resources, is the PCSP (Permanent Commission of the South Pacific) Chile, Peru, Ecuador and Colombia. Although the most important financing for Peru comes from

\* Corresponding author.

E-mail address: [juan.barragan@uca.es](mailto:juan.barragan@uca.es) (J.M. Barragán).

the GEF (Global Environmental Fund), which currently has two projects focusing on the Humboldt Current and its fishery resources (6.6 and 8 million dollars). In addition, the IADB (Inter American Development Bank) with \$2.5 million facilitates the undertaking of a project for the adaptation of the fishing sector to climate change and the coastal marine ecosystem (MINAM, 2017). The outstanding feature of the latter entity is that, within the aforementioned project, it has included projects related to a future national policy and national ICZM program in Peru. Also the Government of Flanders (Belgium) currently supports ICZM, however the Belgian government does so through smaller projects such as the SPINCAM (Southeast Pacific Data and Information Network to Support to Integrated Coastal Area Management), which deals with indicators for the coastal zone (IOC/UNESCO-CPPS, 2015 and 2016).

## 2. Objectives, conceptual framework and method of study

The main objective of this paper is to present an overview of ICZM in Peru (MINAM-PRODUCE, 2017). This is primarily intended to improve the information gap previously mentioned. Some valuations of the natural capital of the coast of Peru could also be of interest. Secondly, it is necessary to pursue compelling grounds in support of a national policy on ICZM. The problems of the Peruvian population and coastal activities are likely to demand solutions within the framework of public policy. Thirdly, this paper attempts to contribute a number of ideas to the political agenda on ICZM in Peru.

The conceptual framework and approach of this study is twofold but complementary to ICZM. On the one hand, knowledge of the coastal area of Peru is addressed, and on the other hand its management. The relationship between one party and the other is obvious.

The coastal zone of Peru is interpreted as a Socio-ecological system (Wang et al., 2013). This system comes from recognizing the close relationship between human activities and natural ecosystems. In the resulting geographical environment, ecosystem services are produced. When ecosystems available for human exploitation are interpreted as natural capital (Constance, 1992, 2008). The Ecosystem Based Management (EBM) framework revolves around human wellbeing produced by eco-systemic services. Such services can be assessed as inputs for decision-making processes (De Groot, 1992, 2002; MA, 2003, 2005).

In this theoretical basis a well-known cause-effect analysis method is embedded: DPSIR (Driving Forces, Pressures, States, Impacts, Responses). The evolution of this model up to its current basis (DPSWR) has been studied by Cooper (2013). The W of welfare is associated with the human wellbeing ecosystem that services provide. Human wellbeing is the result of the interaction between natural and social capital (social capital includes human capital and built capital) according to Constanza et al. (2017). The chosen approach is especially suitable for Peru, where poor human wellbeing of its population is a task that must be addressed in all public policies, including environmental (OECD and ECLAC, 2016).

The conceptual framework with which integrated management is interpreted here is that of the Public Policy Cycle (Jones, 1977) and the expected responses in the model DPSIR. There is no doubt that ICZM belongs within this perspective; both for its approach and its method: Problem identification, Programme Preparation, Formal Adoption, Implementation and Evaluation (IMO/FAO/UNESCO-IOC/WMO/WHO/IAEA/UN/UNEP, 1996).

However, the completion of the Cycle described for each national public policy also recommends the application of a method of analysis: The Decalogue for ICZM. The ten elements of this model of analysis are: Policy, Normative, Institutions, Strategies, Instruments, Information, Education, Resources, Managers and Participation (Barragán, 2014). The Decalogue for ICZM has already been tested in other LAC countries in the Ibermar network for ICZM: Brazil, Argentina, Mexico, Chile, Panama, Costa Rica, Cuba, Colombia, etc. The results of these trials can be found in Barragán (2009). Also in Honduras (Caviedes et al., 2014).

The method of analysis referred to as Decalogue is specified below. For the study of the Political element, not only have we consulted the general public policies of Peru but also the sectoral ones, and in a certain manner the current political agenda of the Ministry of the Environment. For the analysis of the Regulations, both general and sectoral laws have been consulted, especially those related to environmental issues and those currently being debated in the Congress on ICZM. In order to address public institutions, the responsibilities and the organization chart of those most linked to coastal space and resources have been studied: environment, water, ports, coastal and marine surveillance, fishing, etc.

With regard to Strategies and Instruments, all those that were being utilised by the aforementioned institutions have been analyzed. The information was processed from official statistics, publications and websites of public institutions. The Education element was studied based on the information provided by the corresponding General Directorate that pertains to the Ministry of the Environment. Respecting the formation of Managers the information encountered is scarce, and the result was mostly obtained from the more than 50 interviews carried out with technicians and officials. For the Resources related to the ICZM, a report was received from the Administration that studied the State Budgets for 2014. Regarding Public Participation, few sources of information exist; citizens are not normally consulted regarding important decisions that affect coastal management. The consultations are carried out mainly within the scope of the public administration. Of the ten elements of the Decalogue, some are treated in greater depth than others due to the lack of information in some cases.

## 3. The Socio-Ecological system of the coastal zone of Peru: A geographical paradox

According to the National Institute of Statistics and Informatics (INEI, 2017), Peru currently has 31.8 million inhabitants. The continental territorial surface amounts to 1,285,000 km<sup>2</sup>, to which should be added the corresponding marina, or Mar de Grau, with another 1,140,647 km<sup>2</sup>. The length of its coastline is 3080 km. From an administrative point of view the coast of Peru is divided into 11 departments or regions, 32 provinces with 117 districts (Novoa, 2007).

The terrestrial part of the country, with 150,873 km<sup>2</sup> according to INEI (2016), is divided into three natural regions, well differentiated from a bioclimatic point of view: Desert coastal region, Andean mountain range and Amazon rainforest (Fig. 1). It should be remembered, for its interest to the ICZM, that the Pacific Desert coast, consists of a narrow strip between 30 and 60 km wide, with altitudes that rise to 600–1000 m above sea level (Bustamante de la Fuente, 2010). Fifty-three short-haul rivers cross this arid coastal strip from the Andean highlands, which flow into the Pacific and supply water to the population and coastal activities.

Another aspect that makes the coasts of Peru highly original is the existence of a cold current. According to Majluf (2002) the oceanographic characteristics of the Peruvian sea are governed by a complex system of currents that give rise to one of the most important upwellings of the planet. The Humboldt Current explains why Peru is one of the world's leading fishing powers.

It is worth noting the global atmospheric events that periodically produce oceanographic, meteorological and biological disturbances on the South Eastern Pacific coasts. The El Niño phenomenon (FEN) is defined by the presence of warmer than normal waters for more than four consecutive months in this part of the Pacific Ocean basin. Alterations, in turn, often cause disastrous effects on people and assets. For example, the FEN of 1997–1998, one of the largest of the last 150 years, caused torrential rains, large floods and abnormally high temperatures (MINAM, 2015). Of course, it also affects the agricultural rhythms, the availability of water for human consumption, the abundance and composition of marine species, the reproductive process of fish, among other disturbances.

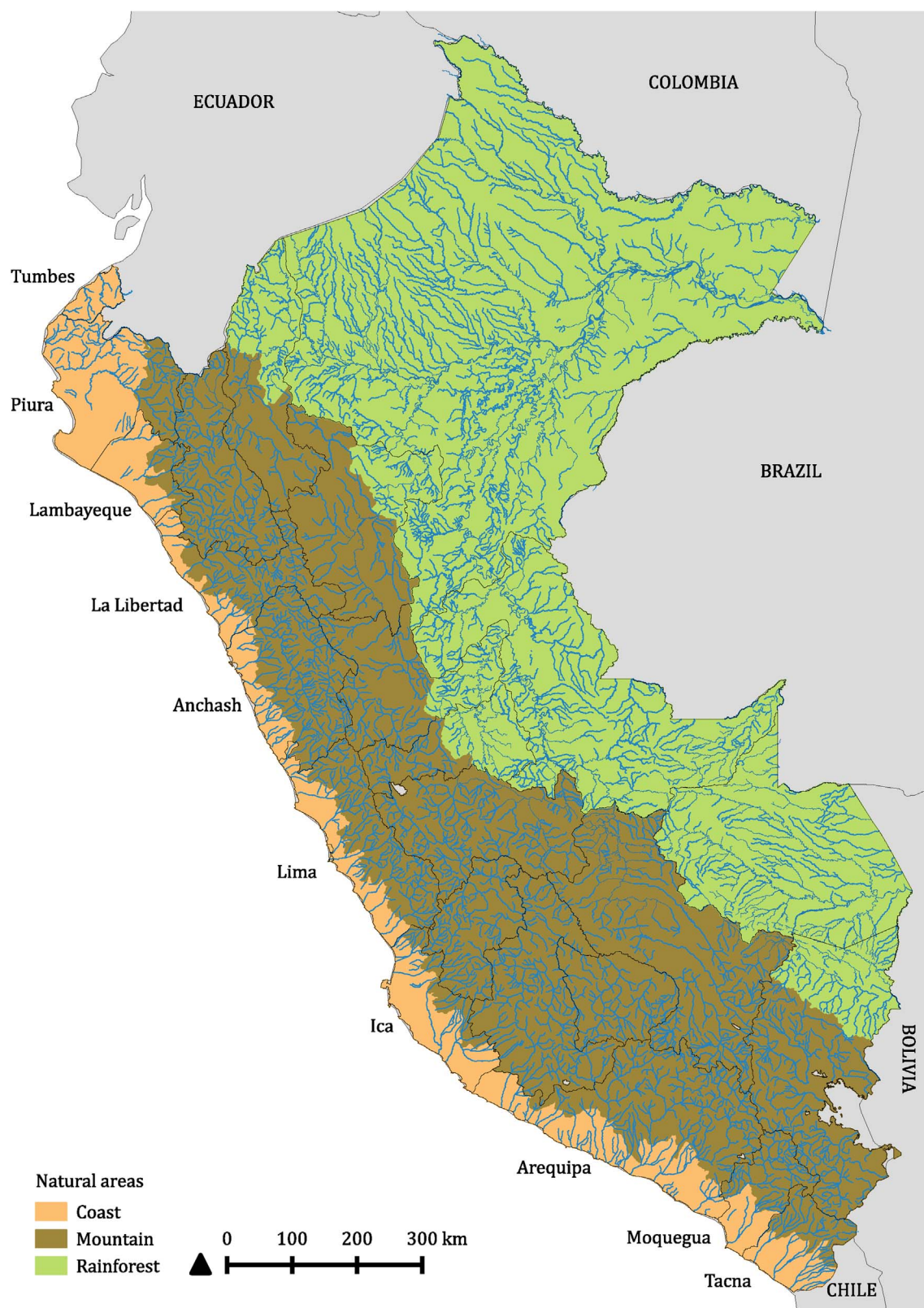


Fig. 1. The coast of Peru within the framework of its geographical structure.

For a future ICZM national policy or programme, a precise delimitation of the Socio-ecological system of the ZMC of Peru must be created. Accordingly, we must use the criteria indicated for ICZM by some authors (Milanes et al., 2017). The future land delimitation of the coastal zone should include at least: the middle and lower parts of the

Pacific watersheds, the coastal wetlands (all northern mangroves, coastal lagoons, river mouths and estuaries, etc.) beaches, dunes, islands, cliffs and coastal hills (the latter for their biodiversity serve as a boundary in several coastal regions of Peru). In the marine part, coastal waters reach five nautical miles and are defined by legislation for

**Table 1**

Distribution (%) of the surface, population, number of medium and small companies, and availability of water by geographical regions.

Source: INEI, 2017, Ministry of Production (2016) & ANA, 2015.

	COAST	MOUNTAIN	JUNGLE
Extension	11.7	27.9	60.3
Population (2016)	56.3	29.7	14.0
MSMEs (2015)	77.1	16.7	6.2
Water	Pacific Basin	Titicaca Basin	Amazon Basin
	1.80	0.50	97.2

artisanal fisheries. Most of the shallow coastal waters are concentrated in this narrow strip, and especially the problems that interest ICZM.

A “geographical paradox” is observed within the territorial outline described. This is summarized in the following way (Table 1): 56% of the population and 77.1% of the medium and small enterprises (MSE), are concentrated in just over a tenth part of the territory, mainly desert, that has only of 1.8% of water resources. A good part of the total population, one third, and economic activities (almost 50% of the MSMEs; which create the most employment) are concentrated in Lima-Callao. Regional, demographic and economic contrasts continue to increase in recent decades.

#### 4. Results

##### 4.1. With regard to the socio-ecological system of the coastal zone of Peru

The joint interpretation of the DPSIR and MA (Millennium Ecosystem Assessment) models is shown in Fig. 2. The analysis scheme is presented in the following order: a) describes the main drivers that affect space and resources of the coastal zone, b) mentions the main pressures generated by human activities, c) highlights the most

important changes in status of the socio-ecological coastal system, d) the main impacts on ecosystem services are indicated, d) the impact that each of those elements has had on the well-being of the Peruvian population dwelling on the coast is summarized.

One of the main drivers is related to population growth. Peru has gone from having little more than six million inhabitants to 31 million between 1940 and 2015, according to INEI (2016), all of which is concentrated on coastal regions; that have gone from 2.8 million inhabitants to almost 20 million in that same period of time (Table 2). According to Novoa (2007) 86% of coastal population can be considered urban. What is more, the rapid model of economic growth that Peru has undergone in the last two decades is a prominent driver. Some of the most important activities are related to the export of fish (especially breaded fish), agricultural products, minerals, manufactured products, etc. According to OECD and ECLAC (2016), the Peruvian economy has experienced one of the largest growths in LAC (6.4% average annual increase between 2003 and 2013). This economic growth has also been concentrated on the coast. Development policies pursued in recent decades help understanding of the resulting imbalance.

The OECD and ECLAC (2016) report on the environmental performance of Peru stresses that the greatest pressures that have been noted on the coastal marine ecosystem are associated with the growing percentage of industries and population on the coast of Peru, producing over-exploitation of marine resources and alterations in the quality and properties of marine and continental water.

The main pressures come from cities: above all they are expressed in terms of untreated liquid discharge and solid waste without management. According to MINAM (2014) only one third of the country's wastewater is treated. Furthermore, 40% of the hydrographical watersheds monitored do not meet the environmental standards (ANA, 2015). The intensive agriculture of the lower basins of the rivers also

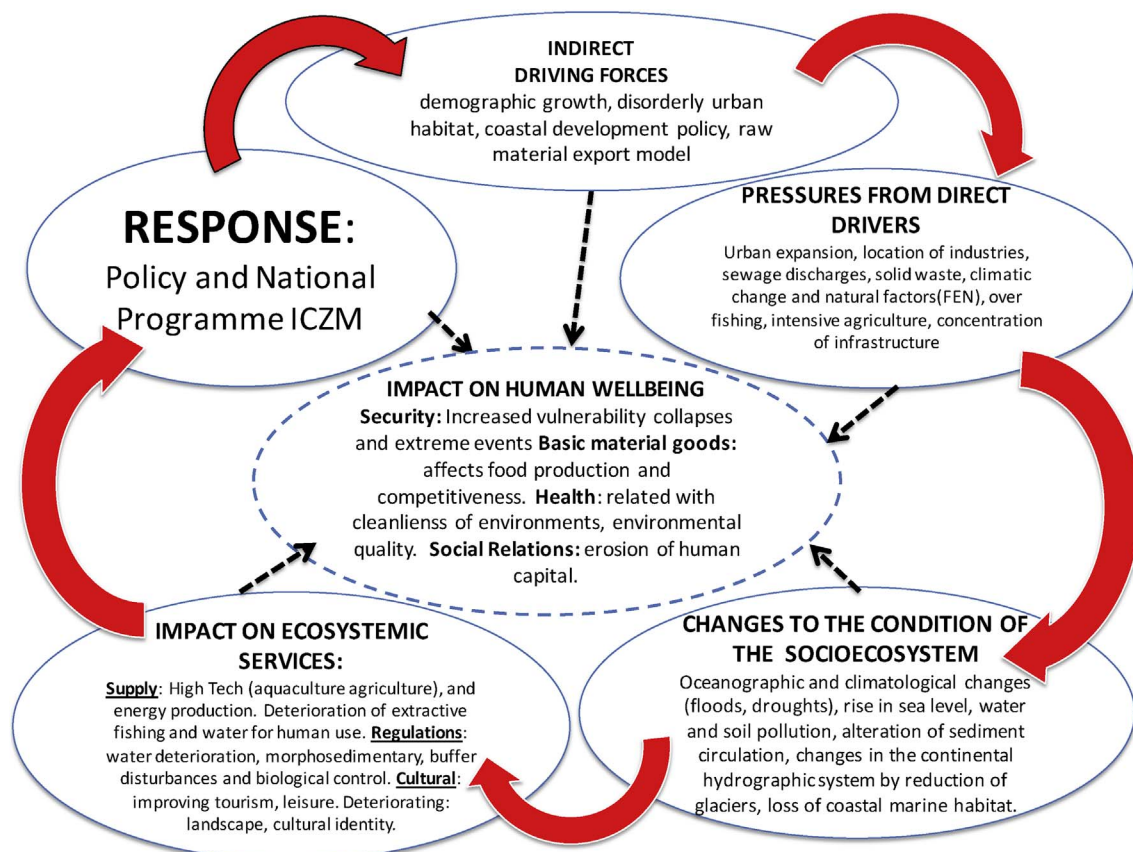


Fig. 2. Interpreting the Socio-ecological system of the coastal zone of Peru.

**Table 2**

Evolution of the Peruvian population according to coastal regions.  
Source: Adapted from [INEI data \(2017\)](#).

	1940	1961	1972	1981	1993	2007	2015
Total Peru	6,207,967	9,906,746	13,538,208	17,005,210	22,048,356	27,412,157	31,151,643
Total coast	2,835,965	5,258,378	7,828,680	10,287,081	13,545,493	17,306,635	19,795,994
Áncash	428,467	586,214	732,092	826,399	955,023	1,063,459	1,148,634
Arequipa	263,077	388,881	529,566	706,580	916,806	1,152,303	1,287,205
Callao	82,287	213,540	321,231	443,413	639,729	876,877	1,013,935
Ica	140,898	255,930	357,247	433,897	565,686	711,932	787,170
La Libertad	395,233	597,925	799,977	982,074	1,270,261	1,617,050	1,859,640
Lambayeque	192,890	342,446	514,602	674,442	920,795	1,112,868	1,260,650
Lima	828,298	2,031,051	3,472,564	4,745,877	6,386,308	8,445,211	9,834,631
Moquegua	34,152	51,614	74,470	101,610	128,747	161,533	180,477
Piura	408,605	668,941	854,972	1,125,865	1,388,264	1,676,315	1,844,129
Tacna	36,349	66,024	95,444	143,085	218,353	288,781	341,838
Tumbes	25,709	55,812	76,515	103,839	155,521	200,306	237,685

affects the quality of the waters. The same can be said for the mining waste of the high and middle basins. The quality of the coastal waters decreased in the period 2003–2013 in some bays such as those of Huacho, Callao, Chancay and Chimbote. There is an urgent need for at least 100 landfills to dispose of solid waste; Currently there are only nine (of which five are in Lima). Other pressures indicated by [Galarza and Kamiche \(2015\)](#) refer to over-fishing.

Climate change is another pressure to be mentioned. Peru is the third most vulnerable country in the world to climate change, behind only Bangladesh and Honduras ([MINAM, UNDP, and GEF, 2009](#)). Its production of food (agricultural and fishing) depends to a large extent on hydro-meteorological conditions, which are extremely variable ([MINAM, 2016](#)). The IDB and ECLAC (2014) collected sufficient evidence (analyzing ten indexes of extreme events between 1965 and 2006, carried out by the National Hydrology and Meteorology service of Peru). From this data it can be said that there are increases in the level and intensity of rainfall on the north coast. Additionally, temperatures on the South Coast record an increase. Finally, the preparation of the coast for development (construction of ports, public works related to transport, etc.) is also a major driver.

The most significant changes observed are the following: oceanographic (variation of the oceanic climate) and continental climate change (greater number of floods and droughts), rising sea levels, water and soil pollution, alteration of the circulation of sediments in rivers and coasts, the loss of glaciers that feed the hydro-graphic system and the loss of aquatic habitats due to degradation of estuarine and coastal waters ([OECD and ECLAC, 2016](#)).

Between 2016 and 2017, using the existing bibliography and the information of more than 50 interviews with Peruvian officials and specialists, the primary author of this research, proposed an advance in the evaluation of the direct services (supply, regulation and cultural) of coastal marine Ecosystems of Peru ([MINAM and PRODUCE, 2017](#)). The technique employed was the same as that applied in the evaluation of the coastal Ecosystems of Spain ([MARM, 2011](#)) and in the evaluation of the coastal ecosystems of the region of Andalusia ([CMA, 2012](#)). The main results on the impact of human activities and climate change on Peruvian natural capital varies from one type of service to another ([Table 3](#)).

Supply services are very important for a country where the primary sector is so relevant. It is noteworthy that the provision of two of the most important supply services related to fisheries and water display the least favourable performance. Technical services of food production (aquaculture and intensive agriculture) and energy, shows better performance in their development.

Regulatory services show regressive evolution. Those of water regulation and biological regulation are of extreme importance to the food security of the country. It draws attention to the worst behaviour of the disturbance-buffering service, due to what it represents for the safety of

a population that is especially vulnerable to natural events and the effects of climate change.

Cultural services are not yet the most essential at this stage of Peru's economic development. However there is no doubt that they will be important in advancing the stages of future human wellbeing. For this reason it is necessary to be extremely attentive to certain services such as those that provide aesthetic enjoyment through the landscape, or cultural identity and a sense of belonging. The dependence of coastal and marine tourism on cultural services is indisputable.

The implication for human wellbeing from the loss of natural capital from the Peruvian coast area results in the emergence, or increment, of several problems. These are summarized as:

- 1 Exposure and vulnerability to climate change and the El Niño phenomenon: Due to its high dependence on primary economic activities (fisheries, aquaculture, agriculture) related to hydro-climatic and oceanographic factors. In addition, cities and infrastructures have been built with relative resilience in recent decades.
- 2 Pollution of the waters and coastal soils: Contaminated water, solid urban waste, industrial, agrarian and mining spills reach the sea directly from urban or industrial areas, through most of the 53 river mouths.
- 3 Deterioration or loss of natural habitats: Usually caused by changes in land uses derived from urban growth (intensely concentrated on the coast), and the development of some economic activities. Also by urban, agricultural and industrial pollution or inadequate or prohibited fishing practices. The deterioration of the 92 wetlands along the coast reduces all types of services that generate these ecosystems ([ProNaturaleza, 2010](#)).
- 4 Alteration of morphosedimentary processes: These are related to the construction of coastal infrastructures (dams, ports, etc.), hydraulic infrastructures (sediment retention in water reservoirs), industrial, residential, tourism and leisure areas, etc. The case of the construction of Salaverry Port, whose construction caused considerable erosion to the beaches of Trujillo, is only one example.
- 5 Inadequacies in the quality of life in cities and urban environments: The growth of cities is the result of a disordered urban model; where environmental quality needs urgent improvements. Territorial development has not taken into account the value of the landscape from a cultural or economic point of view.
- 6 Loss of competitiveness and attractiveness for investment: Tourism, leisure and recreation may be affected by the deterioration of the quality of the waters and coastal areas. Large infrastructures are likely to increase their maintenance costs.
- 7 Conflicts between users of different ecosystem services: The fact that uses and activities transfer certain production costs to other users is repeated on many occasions. For example, the inhabitants of coastal cities transfer the costs of the lack of purification of their wastewater

**Table 3**

Changes in the Direct Services of Peruvian Coastal Marine Ecosystems Over the Last 50 years.

Source: MINAM and PRODUCE, 2017, adaptation to the climatic change of the fishing sector and coastal marine ecosystem. National Policy of MIZMC of Peru.

Services			Evolution	
Supply	Food Production (Artisan Fishing)		↘	
	Food Production (Aquaculture)		↑	
	Food Production (Intensive agriculture)		↑	
	Energy production		↑	
	Human water uses		↘	
Regulation	Water Regulation		↘	
	Morphosedimentary Regulation		↘	
	Shock buffers		↓	
	Biological control		↘	
Cultural	Scientific Knowledge		↗	
	Cultural identity		↓	
	Aesthetic enjoyment of the landscape		↓	
	Support fot the tourism, recreation and leisure		↗	
	Environmental education		↗	
Low importance		Medium importance	High importance	Very high importance
Deterioration		Maintained	Improving	
↘↘		→	↑↗	

to the fishermen.

The relationship of the loss of natural capital to human wellbeing can be interpreted as shown in Table 4. Taking into account its four dimensions (MA, 2003 and 2005), it seems that the basic material goods required for a dignified life is one of the categories most affected. Security and social relations are also clearly negatively impacted. Pollution of coastal waters and soils, exposure and vulnerability to climate change, poor quality of life in cities, and the deterioration or loss of coastal habitats, are basic themes for a national ICZM policy.

Finally, it is necessary to comment on the relationship between the DPSIR framework and the Decalogue for ICZM. This relationship is established in the following way: the DPSIR is a model specialized in diagnoses based on the cause-effect relationship of human activities with respect to ecological systems. It is cyclical in nature, and each cycle finishes with “Responses” that are required for the issues found in the Socio-ecological System (Fig. 2). Normally, these “Responses” are oriented towards very general management aspects: “policy response

options, an initiative intended to reduce at least one impact”, etc. (Cooper, 2013). Additionally, the “Responses” are interpreted as the management of ecosystems: “maintaining ecosystem functioning and biodiversity, management change, prevention measures, protection, nutrient and pollution reduction” (European Environment Agency, 2015). These “Answers” almost always propose “what” should be done. But in many cases it is forgotten “how” to do it from the point of view of management (which is difficult). For this reason, the Decalogue for the ICZM, which will be explained later, specifies how ten elements of management can be employed to address these changes from the public sphere (although also bearing in mind citizens and companies).

#### 4.2. Regarding the coastal zone management model

Following the aforementioned method it is necessary to comment on the results obtained from the analysis of the management of coastal areas of Peru (MINAM-PRODUCE, 2017). The analysis of the Decalogue for ICZM offers the following results:

**Table 4**

The Relationship between the problems of the coastal area of Peru and some dimensions of the loss of human wellbeing (X Relationship XX Strong Relationship).

Associated Problems	Dimensions for human wellbeing <sup>a</sup>			
	Security	Material Goods	Health	Social Relations
Exposure and vulnerability to climate change and FEN	XX	XX	X	X
Pollution of coastal waters and soils	X	XX	XX	XX
Deterioration or loss of natural habitats	X	XX	X	X
Alteration of Morphosedimentary processes	XX	X		
Inadequacies in the quality of life in cities and urban environments	X	X	XX	XX
Loss of competitiveness and attractiveness to investment		XX		X
Conflicts between users of ecosystem services		X		XX

<sup>a</sup> A more detailed description of the dimensions of wellbeing can be found in MA, 2003 and 2005. (MINAM and PRODUCE, 2017).

#### 4.2.1. Policy

Currently there is no specific policy developed for ICZM, but there are other national policies of great interest to the coastal zone. Among the most important include: 1) National Agreement No. 19, State policy for sustainable development and Environmental management (2007); 2) The Bicentennial Plan: Peru towards 2021. (D.S. N° 054-2011-PCM); 3) National Environment Policy (DS N° 012-2009-MINAM); and 4) National Water Resources Policy and Strategy (D.S. N° 006-2015-MINAGRI). These four national policies mention the need to support ICZM. Moreover, the national Environmental Health Policy 2011–2020 (RM N° 258–2011/MINSA) highlights the urgency of improving environmental sanitation on the Peruvian coast.

The orientations of some cooperation agencies are of considerable political importance for a country like Peru, which is in great need of international aid. In this regard, the Environmental Performance Assessments of the [OECD and ECLAC \(2016\)](#) stand out. Its recommendations have, in fact, become part of national policies of all those ministries involved. The recommendation number 56 asserts the need for an integrated approach to coastal resources in the country.

In the national political agenda, ICZM has been explicitly present for the first time in 2016. In fact, the Minister of the Environment, indicated before the Congress of the Republic the following priorities for the 2016–2021 legislature: sustainable use of biological diversity; adaptation and mitigation to climate change; efficient management of solid waste; marine-coastal integral management; prevention, pollution control; adaptation of environmental institutions. As noted, the current government suggests ICZM as a priority, which constitutes a positive development over previous political agendas.

Nonetheless, during the first year of the current legislature (August 2016 and July 2017) two facts are observed:

- a) ICZM has not occupied a preferential position on the political agenda. This may be due, in part, to the catastrophes that *El Niño Costero* caused in the first few months of 2017. However, even before these climatic events occurred, the new policy on climate change had not been explained or described at all. ICZM of the Peruvian Government, MINAM, has not yet been made public or the guidelines of its policy for coastal zones.
- b) The few things known from the policy on ICZM emphasizes that the process should be bottom-up. The institutional message is that the local agenda should lead the national political agenda. Such an interpretation is very interesting and positive, albeit incomplete. Likewise, the State must simultaneously initiate, a "top-down" course. First, because it has more responsibilities and many more means at its disposal. Additionally, it must lead such a complex and highly demanding institutional process with regard to the necessary capacities. The opposite may lead to the frustration of local and regional authorities (in need, as in other countries, of a well-defined legal framework, efficient coordination, orientation and guidance, specialized staff, economic resources for incentives, etc.). Without these requirements, regions and districts could well see little or slow progress in the implementation of coastal public policies.

The last fact of great importance within policy is the work that the Ministry of the Environment and Production have performed during 2016 and 2017, within the framework of the Convention of Technical Cooperation not Reimbursable between the Republic of Peru and the IDB: "Adaptation to climate change in the fishing sector and coastal marine ecosystem". Part of the resources of this project have been allocated to the formulation of the Peruvian national policy of ICZM. At the moment the country has a draft, whose conceptual framework is EBM and is oriented, through the Decalogue of ICZM, towards a public policy. This draft, enriched with the contribution of dozens of officials and technicians, should serve to focus the institutional and citizen debate to be carried out in the near future.

#### 4.2.2. Regulations

There are abundant regulations that interest ICZM ([Huanca, 2011](#); [Monteferri, 2016](#)). On the one hand, there are general laws that must be taken into account when distributing responsibilities related to coastal zone. For example, in the case of Peru, there is no doubt that it is essential to understand the content of the law on the basis of decentralization (law 27783), the Organic Law of regional Governments (law 27867), the Organic Law of Municipalities (law 27972), among other reasons because they provide guidance on the role that could be assigned to each scale of management in a supposed national program of ICZM.

From an environmental perspective, the General Law of the Environment (Law N° 28611) highlights the responsibility of the State to *regulate the territorial planning of marine and coastal areas ... the development of plans and programmes aimed at preventing and protecting marine and coastal environments ... or the proper use of beaches*. From a sectoral point of view, Peru's legal system has interesting regulatory instruments, significant references being the General Fisheries Act (Decree Law No. 25977) or the Law on the promotion and Development of aquaculture (Law No. 27460), the law of the National port System (law 27943), the Water Resources Act (Act No. 29338) of 2009.

There are other very useful regulations relating to the performance of some important ICZM tasks. For example, the law of 2007 declares that coastal beaches are public goods, inalienable without statutory limits and establish a restricted domain zone (law N° 26856). In addition, this rule is of enormous interest because in article one it describes the concept of beach (where it fixes a protection strip not less than 50 m wide). In addition, the second article of this law establishes *the restricted domain area as the 200-m strip located below the 50-m strip described in the preceding article, provided that there is geographic continuity throughout that area*.

Another interesting finding is the Legislative Decree 1147 (2012), which regulates the powers of the National Maritime Authority (General Director of Captaincies and Coast Guard). Article two establishes that the scope of surveillance and control shall be as follows: (a) the aquatic environment comprised of maritime and inland waters, as well as navigable rivers and lakes, and island areas, including islands located in the aquatic environment of Peru. (b) Coastal land up to 50 m, measured from the highest tide line of the sea and the riverbanks to the highest ordinary rising line on the banks of navigable rivers and lakes ([Fig. 3](#)).

Regulation (D.S. n° 015-2014-de) of the aforementioned standard on the National Maritime Authority is interesting as it defines the coastal area as being the *"space covered by the aquatic strip of five nautical miles measured from the lowest line tide to sea inland, including the islands and islets and the riverside strip. Considered to be included in this zone are: a) The marshes, lagoons, marshlands, and, in general, the low terrains that are flooded as a consequence of the flow and reflux of the tides, of the waves, or of the filtration of the seawater. (b) The considerably vertical cliffs that are in contact with the sea"*. It also offers a definition of an area of extraordinary interest to ICZM. *"This is the particularly sensitive maritime area: which is the subject of special protection, in accordance with the measures adopted by the International Maritime Organization (IMO), in the interest of its importance for ecological, socio-economic or scientific reasons and that their environment could suffer damage as a result of maritime activities"*.

However, the most current laws that are of interest to ICZM in Peru are the following two that were approved in 2017: law N° 30590 "that promotes the recovery, conservation and maintenance of the beaches of the littoral" and the Law (Provisionally approved on July 12, 2017) of "Sustainable management and integration of Peruvian coastal marine zones for their protection, recovery, maintenance and sustainable use".

The first is excessively basic. It consists of only two articles: one of which is directed towards "interest and public necessity of recovery, conservation and maintenance of the beaches of the littoral"; while the other is intended for the "Ministry of the Environment, in coordination

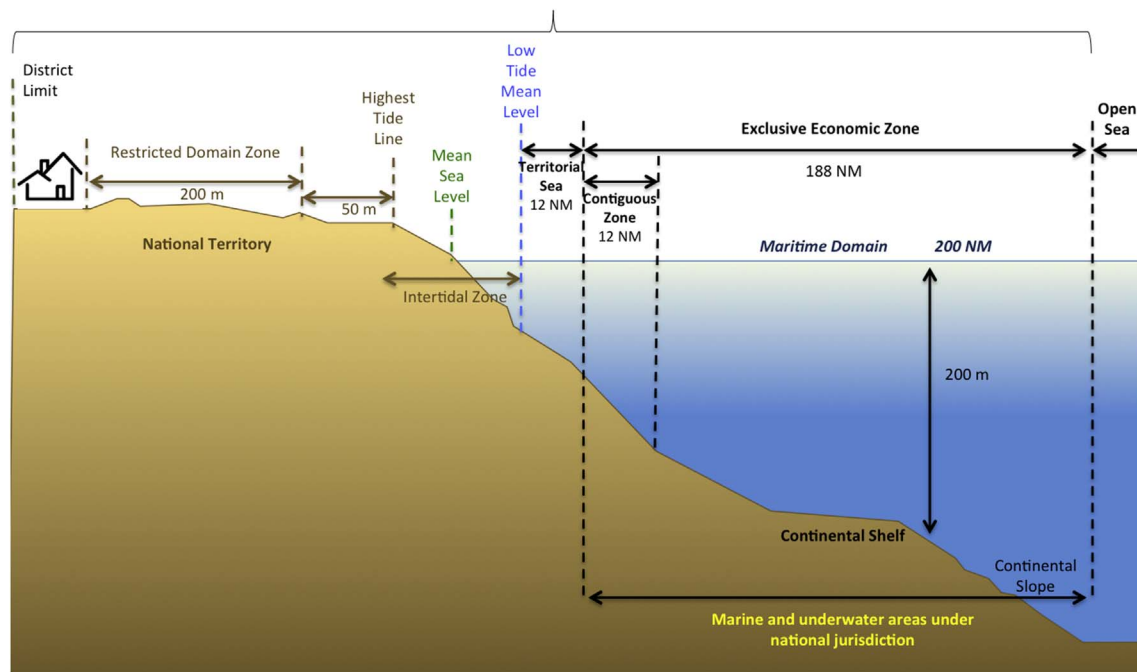


Fig. 3. Administrative legal limits of the coastal marine area of Peru.

with the competent entities, that carry out the necessary actions in order to prioritize the recovery, conservation and maintenance of the beaches of the littoral, according to their competences and available budget, without demanding additional resources from the public treasury."

The second law, with only eight articles, draws attention to a) the guiding principles of sustainable and integrated management of the coastal zone of Peru (which include: participatory management, an ecosystem approach, concurrence of government and subsidiary levels and prevalence of public interest over private interest), (b) the principal governing body (MINAM), c) guidelines for the "Funds for Recovery, Remediation and Compensation", and (d) the creation of the "Observatory for the Sustainable and Integrated Management of Coastal Marine Zones".

#### 4.2.3. Institutions

Until recently there was no institution in Peru responsible for ICZM. MINAM was created in 2008, and assigned tasks related to the coastal environment. Within this ministry there is a specialized institution: the Multisectoral Commission for the Environmental Management of the Marine-Coastal Environment, COMUMA, (D.S. No. 096-2013-PCM). It is a permanent commission, whose aim is to coordinate and monitor environmental management in the marine-coastal environment, in all sectors and levels of government. Other tasks of this institution are associated with the development of standards, directives, protocols and technical guides, training related to space and coastal resources. It has worked well for a number of years. The majority of the institutions related to coastal zones are represented: Ministry of Environment (the president), Foreign Relations, Production, Energy and Mines, Transport and Communications, Housing, Construction and Sanitation, Port Authority, National Water Authority, Institute of the Sea of Peru, National Service of Natural Areas Protected by the State, National Forest and Wildlife Service, Captaincy and Coast Guard DG, Management of Hydrography and Navigation of the Peruvian Navy. In addition, several Technical Working Groups (GTTE) have been set up for its operation. One of them is on ICZM. The work of this Commission has been very transparent and of great value (the minutes of the institution can be accessed on their webpage).

In 2017 there have been interesting and positive institutional

changes. In April 2017, the Organization and Functions Regulation (ROF) of MINAM (SUPREME DECREE No. 002-2017) was approved. In Article 60, the tasks of providing instruments for ICZM and providing technical assistance are assigned to the General Director of Environmental Land Planning.

The Law of "sustainable and integrated management of the coastal marine areas of Peru for its protection, recovery, maintenance and sustainable use" of 2017 identifies MINAM as responsible for the development of a glossary of terms referring to the law. It also instructs MINAM to set up the Technical Council for Sustainable and Integrated Management of Coastal Marine Areas. This Technical Council must, among other tasks, delimit the coastal zones and formulate an integrated policy.

Finally, it is necessary to emphasise the importance of institutions created for ICZM in other levels of government. Its relevance is that these will be the bridges between the local and regional levels with the National State. In fact, the so-called Local Management Committee for ICZM in the provinces and districts, and the Regional Technical Group for ICZM (which emerges from each Regional Environmental Commission) in the Regions or Departments, are the key institutions. Thus, the advances of institutional functioning in Piura, Lambayeque, La Libertad, Ancash, Lima, Ica, Arequipa and Moquegua stand out. It should be noted that these advances are not evolving at the same pace throughout the country, nor are they homogeneous in their content.

#### 4.2.4. Strategies

Some of these policies are developed through their corresponding strategies, however we must recognize that these are instruments that do not always guarantee performances. In Peru there are some that are of interest to ICZM:

- National Strategy for Climate Change (D.S. 011-2015-MINAM). The fact that Peru is very vulnerable to climate change needs to be taken into account. There are also some key issues in coastal areas: water availability, climate change impacts on the coast, rising sea levels, etc.
- National Wetlands Strategy, (D.S. No. 004-2015, MINAM). It is important for ICZM within the category of Coastal Wetlands considered: mangroves, lagoons, coastal oases, deltas and estuaries. The

focus is very interesting as it identifies ecosystem services that provide human wellbeing.

- c) National Strategy on Biological Diversity (D.S. No. 009–2014, MINAM). It is interesting because it offers details and specification on tasks and schedule as well as on some actions that are to be developed related to marine coastal ecosystems

Two other strategies that are not approved (although there is a draft) but will be very important for the ICZM are:

- d) Strategy for the “Direction and Management of the Coastal Marine Ecosystem and its Resources”, in which COMUMA is working. This strategy, once approved, will be one of the pillars of the future MIZMC National Policy and Programme. Among other reasons, it will guide the model of environmental management of coastal marine ecosystems.
- e) Strategy for “Adaptation to Climate Change in the Fisheries and Aquaculture Sector” coordinated by the General Director of Sustainable Fisheries of the Ministry of Production.

#### 4.2.5. Instruments

Peru has a significant number of instruments of interest to ICZM. Among them those of Land Planning deserve attention. The Policy Guidelines for Land Management (R.M. No. 026-2010-MINAM) suggest the need to “Implement Land Planning and the integral management of watersheds and coastal marine areas in order to contribute to the sustainable development of the country.” Although there are numerous instruments related to Land Planning (Land Planning Plan, Urban Development Plan, Ecological Zoning, Specialized Studies, Integrated Territorial Diagnosis, etc.), progress has been poor in the management of Peruvian territory. Even in the last institutional reform of 2017 General Direction for Land Planning has changed its name to Environmental Land Planning, which is a less integrative denomination. This is to avoid conflicts with other ministries, especially those related to development.

In another dimension, the National Environmental Action Plan PERU 2011–2021, (Supreme Decree No. 014-2011-MINAM) stands out. It also contains a specific goal for ICZM: by 2021, 100% of the Coastal Regional Governments should have formulated and approved at least one ICZM Plan.

Another of the most important instruments is the Action Plan for Adaptation and Mitigation to Climate Change. This plan makes a clear proposal: the need to formulate ICZM plans taking into account climate change employing the EBM approach.

The Master Plan for Natural Protected Areas (D.S. No. 016-2009-MINAM) is also a key instrument. In this case, one of the main objectives in the management of SERNANP (National Service of Natural Protected Areas) is “to increase the representation in the Eastern Tropical Pacific Province, which extends off the coast of Piura and Tumbes.” The proposal is of the utmost importance. The reason is simple: coastal ecosystems are under-represented in the set of protected natural areas (PNA). In fact, Peru has 77 PNA in more than 21 million hectares (Fig. 4). In the coastal area only 639,000 ha are protected, and they largely correspond to the marine environment. Additionally 94%, or more than 600,000 ha, is comprised in only three areas: Paracas National Reserve (335,000 ha), San Fernando Reserve Zone (155,000 ha) and the Guano Islands and Capes National Reserve (141,000 ha).

On the other hand, in the National Urban Sanitation Program (PNSU) of the Ministry of Housing, Construction and Sanitation (Annual Report, 2015 drafted in April 2016 derived from DS 002-2012-HOUSING), one of the keys to environmental quality of the waters of the Peruvian coast is to be found –a basic component of any MIZMC National Policy and Programme. It should be noted that the above-mentioned D.S. determines public actions for urban areas.

Among the national plans of great interest for the ICZM of Peru the

National Solid Waste Management Plan 2016–2024 is of important significance. Other reference instruments are: the National Plan for Aquaculture Development 2010–2021, the National Strategic Tourism Plan (2008–2018), the National Port Development Plan (D.S. 009-2012-MTC).

With regard to the specific instruments for the ICZM of Peru, it is important to note the “Guidelines for the Integrated Management of Coastal Marine Areas (R.M. No. 189-2015-MINAM). Its specific objectives should serve to guide the future National Policy of ICZM and the corresponding National Program. Among the goals are:

- Promote the implementation of adequate management of coastal marine areas, articulating and guiding the participation of different levels of government.
- Contribute to the improvement of productive diversification and economic growth through the sustainable use of ecosystems.
- Strengthen institutional capacities.
- Elaborate and implement technical and legislative instruments.
- Promote the incorporation of the integrated management of coastal marine areas in the planning and development of the territory.
- Promote scientific and technical knowledge of coastal marine ecosystems and ecosystem services.
- Promote at the national level the adaptive management of coastal marine areas as the main measure of continuous improvement.

Each Strategic Guideline consists of a brief description and a short list of prioritized actions. There is no doubt that this instrument provides a solid basis for the further development of ICZM at the national, regional and local levels.

Finally, reference should be made to the instruments that have served as pilot projects in the ICZM of Peru. In 2002, through D.S. N° 005-2002-PE, the Government created the High-Level Multisectoral Technical Commission responsible for proposing the “El Ferrol Bay Environmental Recovery Plan”. A year later, in 2003, the Commission of Sustainable Development of the Bay of Paracas was created, through Supreme Resolution No. 029-2003-EM. Other experiences that should be mentioned are: “Regional Integrated Resource Management Program for the Coastal Marine Zone of Piura” (OR No. 115–2006/GRP-CR), “Action Plans for Integrated Management of Coastal Marine Areas of Tumbes (2011), or the Action Plans for Integrated Management of Coastal Marine Zones of Lambayeque (2012). Insights gained should be disseminated with the intention of becoming lessons learned for the future.

#### 4.2.6. Information and knowledge

It can be said that the links between science and ICZM are very weak in Peru. The work of universities and research centres is not well connected with the needs of public institutions responsible for coastal management. Most of the information about CZ is generated by the public administration itself.

In the case of Peru, there are several public agencies that offer good quality and relatively accessible information useful to ICZM. First, the National Institute of Statistics and Informatics (INEI, <http://www.inei.gob.pe>) offers useful detail on population and demographic information, or that related to housing, poverty, etc. The subject of the environment is well organized: Territory, Ports, Forests, Conservation and Biodiversity, Water Resources, Wastewater, Waste Solids, Natural Phenomena, Climate Change, Indicators of Sustainable Development, etc.

The importance that MINAM has given to coastal information is very recent. An Internet map service is under construction called “Environmental Territorial Information Platform” (<http://geoserver.minam.gob.pe/mar-y-costas/>). This platform is organized from three axes, one of which corresponds to the information of “Sea and Coasts”. Within the latter there is a section dedicated to ICZM. It is here advances in the matter can be found. From here you can also access the

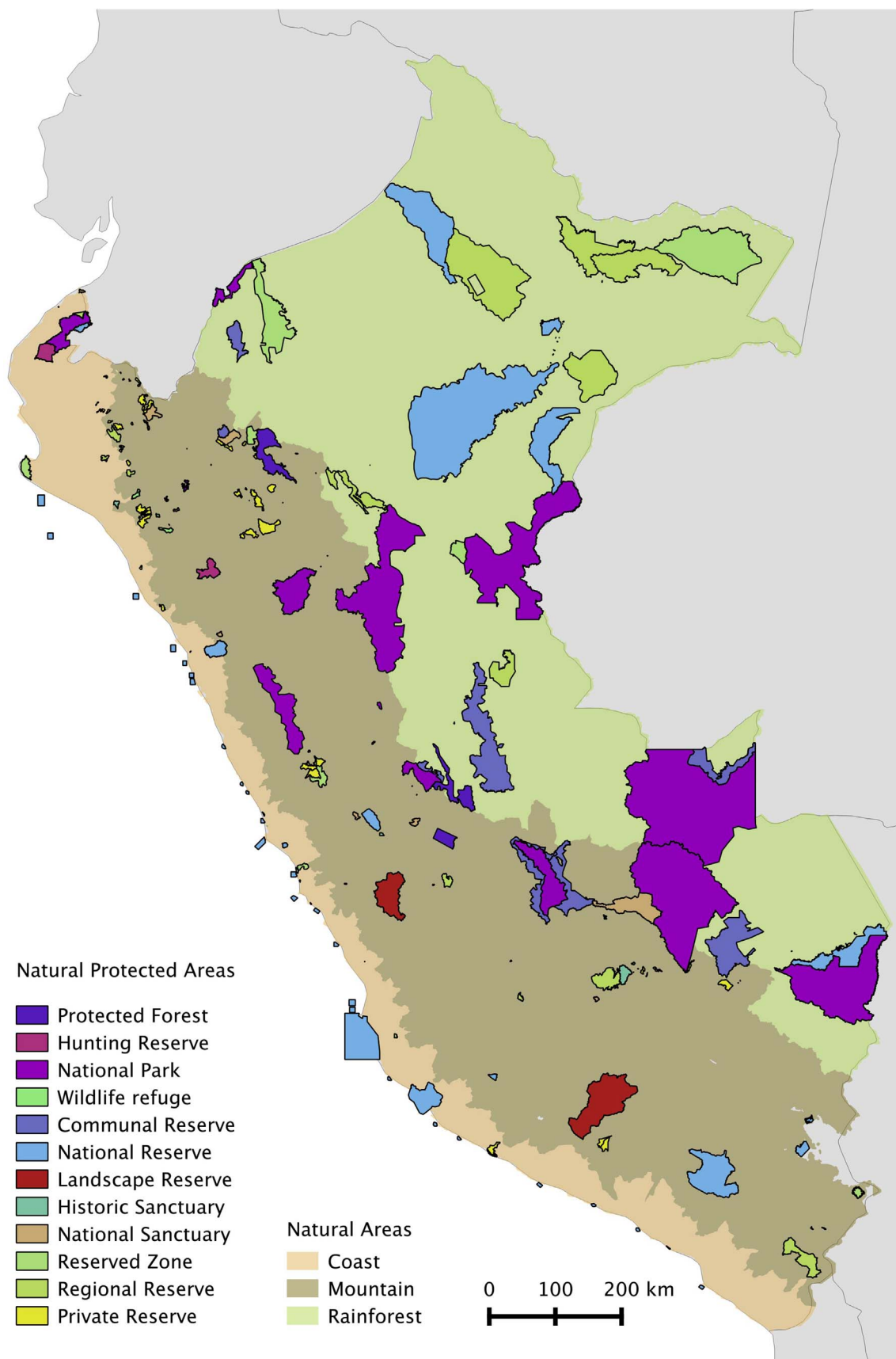


Fig. 4. Distribution of protected natural areas in the regions of Peru.

GeoCostas Platform, which contains information generated from the SPINCAM Peru project (South Pacific Data and Information Network to support the ICZM). The novelty of this Geographical Information System is that it incorporates indicators of different topics of interest for ICZM.

Another source of information refers to one of the main research institutions of the marine environment of Peru: the Institute of the Sea of Peru (IMARPE, <http://www.imarpe.pe/imarpe/>). It is a centre specialized in matters related to the sea. It focuses on scientific research, the study of the Peruvian sea and its resources. Its most important function is to advise the State in decision-making relating to the use of fishery resources and the conservation of the marine environment. IMARPE has a network of coastal centres and laboratories spread all over the Peruvian coast. These facilities make this centre ideal for collaboration on ICZM research. The Atlas Project of this organization aims to contribute information and knowledge about the Peruvian marine environment through the Internet.

Also the Directorate of Hydrography and Navigation of the Peruvian Navy (<https://www.dhn.mil.pe>) generates information of great interest for MIZMC. The Technical Departments in which it is organized (Hydrography, Nautical Signage, Oceanography, Cartography, Navigation and Special Projects) offer information to manage the activities related to environmental sciences in the aquatic field. Their main contributions are nautical charts.

With respect to artisanal fisheries, the Ministry of Production (<http://www.produce.gob.pe/index.php/ministerio/sector-pesca>) generates interesting information on the sustainable fisheries and climate change. The Fisheries Environmental Division, for example, provides environmental information on fisheries and aquaculture to the governing body of the National Environmental Information System.

#### 4.2.7. Education

The National Environmental Education Policy (D. 017-2012-ED) establishes a series of objectives, guidelines, etc. which aims at promoting an active integrated citizenship within a more sustainable development model. Based on these precepts an Environmental Education Guide for Coastal Marine Zones (2013) was written. This guide aims to support educational action in the coastal municipalities of the country. It aims to develop values, attitudes and behaviours that facilitate the protection and enjoyment of coastal zones. Although it is designed only for beaches, the approach of the guide deserves recognition because, from the beginning, it addresses environmental education by looking at problems. Furthermore, because this approach focuses its activities throughout the social players as protagonists: local governments, civil society, entrepreneurs, fishermen, vacationers, merchants, etc.

There are other interesting initiatives from MINAM that, from time to time, organize campaigns and activities related to education for the sustainability of coastal and marine environments; especially for the users of the beaches: “I play fair with the sea”, “Do you want plastic in your ceviche?”, “Bring water to drink from your house”, “I play fair on the beach 2016”.

#### 4.2.8. Resources

It is not easy to determine the economic resources that affect the tasks and activities related to ICMZ. The only work that can guide in this regard is that of Salhuana (2013). Its report lists eight Programs of the Draft Budget Law of 2014 linked, directly or indirectly, to the objectives of ICMZ. Of these eight programmes, three of them (urban sanitation, rural sanitation and related to the integral management of solid waste) take up 93% of the budget (4200 million Soles). The programme directed at urban sanitation alone absorbs 45% of the total budget.

Although the geographic scope to which budget expenditure is directed does not coincide with coastal zone, this system guides the efforts of the Peruvian Government with respect to certain problems for which it has specific policies and allocates means. In this sense, the least

economically financed programmes are those related to mining environmental impacts, aquaculture, access to property and artisanal fishing.

Using the same source of information (Ministry of Economy and Finance), the aforementioned report outlines, for each program, the key issues or problems that would be affected, and which are related to coastal resources or spaces. The detailed analysis of the budget reveals that the amount allocated to public policies related to resources of the coastal zone is quite reduced. Additionally, items oriented exclusively for ICMZ do not exist.

#### 4.2.9. Managers

Over the past five years, several courses and workshops on ICMZ have been developed; several of them taught by foreign teachers. They were carried out in various coastal regions (Piura, Ica, Lima, etc.), and were especially oriented at public managers. However it must be clarified that these are not actions included in a training programme, nor sustained over time. Rather it is due to opportunities related with national and international projects or institutions. In almost all the initiatives MINAM appears to be the articulator of the course or workshop, and to a lesser extent the IMARPE (Institute of the Sea of Peru). Very few officials, technicians or university professors with whom interviews have been held have a university degree related to ICMZ. In those courses we have taught the greatest interest came from Peruvian civil servants and technical staff for ICMZ.

#### 4.2.10. Participation

Most of the revised planning or legal support documents encourage the practice of public participation. The Regulation on “Transparency, Access to Environmental Public Information and Citizen Participation in Environmental Matters” is in force (D. S. 002-2009-MINAM). It includes budgets, guidelines, processes and consultation mechanisms. Public hearings, participatory workshops, opinion polls, suggestion boxes, regional and local environmental commissions, technical groups and management committees are cited.

The tangible results of the search for ICMZ search in Peru have resulted in a good deal of consultation mechanisms being used within public administration: ministries, regional and local environmental commissions, management committees, etc. A number of times there are open processes and participants representing NGOs. This is despite the fact that some interesting projects (ADMICCO, Adaptation and Mitigation of Climate Change in Coastal Areas, for example) have been developed by NGOs such as Association Civil LABOR and CooperAcción. Mentioned should also be made of Océana and the WWF for their interest and work in the coastal zones.

## 5. Discussion

It is possible to find national-scale studies in the international bibliography that demonstrate the originality of some Integrated Coastal Zone Management policies or programmes (ICZM). Examples such as The United States of America (Knecht et al., 1996; Hersman et al., 1999), Denmark (Worm, 1997; Anker et al., 2004), Egypt, Tanzania (Masalu, 2000; Gustavson et al., 2009), Panama (Suman, 2002), Spain (Barragán Muñoz, 2003, 2010), India (Noronha, 2004), Vietnam (Sekhar, 2005), The People's Republic of China (Lau, 2005), etc. They have allowed for knowing different experiences and lessons learned. These can be useful for new national initiatives on ICZM. The case of Peru may also be an interesting contribution to the ICZM literature.

There is sufficient evidence that Peru has a lower rate of ICMZ development compared to countries in the Southeast Pacific or LAC. This situation seems to have changed recently (since the beginning of the present decade). The need for some kind of coastal policy is evident. Since 1940 its population and main human activities have continued to be concentrated on a narrow strip of coast; the smallest geographical area with less availability of water. Additionally, demographic, urban

and territorial changes, as well as the growth and economic specialization, have rendered this country particularly vulnerable to the effects of climate change.

In the past two decades, economic advances have taken priority over environmental needs. At present, water supply and pollution, solid waste management, erosion and the exploitation of hydrobiological resources constitute major problems for the Peruvian coastal socio-ecological system. Primarily, they have caused a significant loss of natural capital. This loss is evident in a decline in coastal ecosystem services, which are necessary for human wellbeing. This is more affected by the FEN, for example. Food production is also beginning to be compromised, there is a clear loss of competitiveness in some activities (coastal tourism), health is also compromised by water quality and waste management social relations suffer from the deterioration of the landscape and cultural identity, or from the loss of social capital.

On the other hand, the model of coastal management has been defined thanks to the Decalogue for ICMZ. In general terms, the evidence indicates that it is a country in transition towards a more integrated model. The efforts made in recent years point to a clear and positive trend, however there is still a long way to go.

It can be argued that there is no specific national policy on ICMZ. Nevertheless, there are initiatives that offer favourable perspectives: ICMZ appears explicitly in the government's environmental policy agenda. It has signed agreements with the IDB to advance the formulation of a National Policy of ICMZ. Currently Peru demonstrates a better environmental performance according to OECD standards, etc. In any case, greater political implication of the Peruvian state (top down) should be directed to facilitating the advancement of regions and districts (bottom up) will be necessary.

There is an important regulatory base, of great interest for coastal management. However, this should be complemented by other ICMZ laws that improve the content of those in force, and be more detailed in terms of institutional coordination and cooperation procedures, instruments for coastal management, public participation, etc.

Some institutions must also play a greater role in the management of coastal issues. The institutional weakness observed are normal in a country that has recently addressed these issues. The future Technical Council for Sustainable and Integrated Management of Coastal Areas, as a reference institution for coordination and cooperation, will have to assume its responsibilities, and be efficient in its task. MINAM should lead the necessary institutional effort and improve its specialization in ICMZ issues. This ministry will depend on the formalisation of strategic alliances with other ministries (as it has done with the Ministry of Production), and the signing of agreements with coastal regions. It will also have to lead and supervise the technical work; which, given the current training base of officials will not be an easy task.

Some instruments, whether strategic or operational, are key to progress at this stage of transition to ICMZ. On the one hand, it urges the approval of the "Strategy for the Management of Coastal Marine Ecosystem and its Resources". From this draft it can be concluded that it is a major articulating instrument with respect to others already approved. Also highlighted as key are the "Guidelines for ICMZ". In addition, there are interesting opportunities to improve the representativeness of protected marine natural areas. If this were done, a protected (terrestrial) coastal strip would be created, which would complement the marine nature of the Guano Islands and Capes (spread from north to south of the country). The latter could be the beginning of the creation of a coastal ecological corridor in the Southeast Pacific.

Regional ICMZ plans and programs should be more homogeneous from a methodological and operational (not content) point of view. To this end, the national State has to provide methodological guides and guidelines on the process of institutional agreement (with regions and districts). The evaluation of the degree of success of approved programmes or plans must also be addressed.

For information in support of ICMZ, Peru can turn to MINAM and IMARPE. Both have information and technological resources to feed

any ICMZ process. It is necessary to integrate the information and knowledge that both have of the coastal and marine ecosystems, respectively. It would be immensely positive if IMARPE balance its work on coastal marine ecosystems better. A more ecological and less productive (fishery) perspective would improve decision-making in favour of conservation of ecosystem services in the long term. Universities should play a greater role as knowledge institutions that advise government decision-making.

The limited findings on environmental education and economic resources imply the need for improvements in both elements of the Decalogue. The same applies to the section dedicated to managers. There is no doubt that a public function as specialized as ICMZ, requires capabilities not easily found in a country such as Peru. However, the positive response of Peruvian coastal managers to the organization of workshops, courses and seminars in recent years suggests reasonable success for future efforts in capacity building. These efforts should be reflected in a permanent ICMZ training programme.

Finally, public participation is one of the most important pending issues for ICMZ. The role as protagonist of the public administration should leave more space for an organized society, allowing it to participate in decision-making processes. The progressive increase in the standard of living and the deepening of democratic life require substantial improvements in this regard.

It is quite probable that the lines of action suggested throughout the Decalogue can advance ICZM in Peru. The need for the protection and conservation of certain coastal and marine ecosystems is urgent. Everything suggests that an improvement of the ten elements of the Decalogue (led by Politics, Education and Public Participation) would have a very positive influence on the relationship between the Peruvian society and its coastal marine ecosystems. It is, in short, the search for a new governance model specifically designed for this type of ecosystem.

## 6. Conclusions

Peru presents a complex picture of its coastal management. First of all, vast progress has been made in recent years. During this time a reasonably sound platform has been created to take the leap forward into future challenges: incorporating ICMZ into the government policy agenda, approving ICMZ guidelines and laws, creating coordination tools, etc.

This effort is more necessary than ever. Rapid economic and demographic growth, concentrated on the coast with no environmental responses and, has generated serious territorial imbalances and poor urban quality of life. Population and coastal activities are now more fragile and vulnerable to climate change effects. Human wellbeing will decline further if natural capital and ecosystem services continue to degrade. Pollution of coastal waters, lack of management of large quantities of solid waste, increased coastal erosion, overexploitation of water and hydro-biological resources, etc. are manifestations of a model of economic growth characterized by weakness of integrated environmental responses. Social capital is also affected.

The current stage is key. Peru is at the crossroads of its unsustainability. And the future of its coastal zone begins to be compromised. There can be no development without clean water and well-managed solid waste, nor sustainably managed coastal natural capital. Especially if it is thought to directly affect 86% of its coastal (urban) population. But there can also be no future-oriented activities without healthy coastal ecosystems (artisanal fishing, coastal tourism ...).

For these important reasons action must be taken, and ICMZ is a viable strategy. There are concrete policy opportunities that have been generated from within; such as a number of government policies of the last decade. Other recent opportunities that have external support can also be cited; such as those promoted by the IDB and the Peruvian government directed towards a future National Policy of ICMZ. However the move towards a more integrated model of coastal management requires a greater national effort. At the same time, the

continuity of the support of international organizations (IDB and GEF in particular) is crucial. In any case, respecting national policy and sovereignty, it is necessary that international organizations that cooperate with the Peruvian State, carry out a detailed follow-up of the results of the aid that they lend to projects related to ICZM.

In addition, there is some urgency due to the rapid pace of social and economic phenomena on the coast of Peru. It is necessary to start a cycle of public policies. This must begin by placing ICMZ on the political agenda in a meaningful way; by engaging in actions, increasing spending and institutional effort on those issues or problems that have been described.

This is not a simple task. There will be significant and intense debates on the following: The role of the state, how the state relates to the regions and municipalities, the responsibilities that these two scales of government will have to assume (in a state that aspires to decentralize without success), the future role of universities and the Peruvian scientific system in support of ICMZ, public participation in important decisions, etc.

The ICMZ policy that is formulated has to offer answers to the three main dimensions of integration: socio-ecological, socio-economic and cultural, and governance. There will be no reasonable balance if any are missing. Economic growth has to become economic development. That is why the chosen model must define part of its benefits to environmental responsibilities, a task that must be undertaken by the current and future government, as well as through international cooperation. Otherwise, Peru's coastal socio-ecological system will not be able to withstand the gigantic pressure exerted by human activities.

All of the above requires that the results of national public policies must be measured and evaluated objectively. The intention is simply to know, and disseminate publicly, whether or not national and international programmes and projects have the expected effects on sustainability progress of coastal areas.

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